

Appl. No. 10/814,086  
Amdt. Dated August 10, 2005  
Reply to Office Action of May 10, 2005

**Amendments to the Drawings:**

Submitted herewith is a Replacement Sheet of drawings that includes Fig. 1 with added reference number 20.

Attachment: One (1) Replacement Sheet.

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**•• REMARKS/ ARGUMENTS ••**

The Official Action of May 10, 2005 has been thoroughly studied. Accordingly, the changes presented herein for the application, considered together with the following remarks, are believed to be sufficient to place the application into condition for allowance.

By the present amendment applicants are submitting a Substitute Specification that includes the section headings which the Examiner requested and the amendments on page 2, lines 7-9 which the Examiner requested.

Also by the present amendment the changes to the claims which the Examiner courteously suggested on pages 3-4 of the Office Action have been adapted.

In addition, independent claim 1 has been changed to recite that the upper connection component and the lower connection component are spaced apart by a substantially nonadjustable, fixed distance, and to recite that the at least two shell segments (1) each of which only partially extends that reach, at least in part, around opposite vertical sides of the connection from the outside and in horizontal direction.

Support for these changes to the claims can be readily found in the drawings.

Finally by the present amendment a Replacement Sheet of drawings for Fig. 1 is being submitted that adds reference number 20 to Fig. 1.

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Entry of the Substitute Specification together with the changes to the claims and drawings is respectfully requested.

Claims 1-9 are pending in this application.

Claims 1-8 stand rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 3,838,987 to Draut.

Claims 1, 3, 7 and 9 stand rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,616,112 to Tseng.

For the reasons set forth below it is submitted that all of the claims are allowable over the prior art or record and therefore, each of the outstanding rejections of the claims should properly be withdrawn.

Favorable reconsideration by the Examiner is earnestly solicited.

The Examiner has relied upon Draut as disclosing:

...a locking device capable of vertical connection of an upper connection component 18, that comprises an upper engaging section, to a lower connection component 19, that comprises a lower engaging section, the locking device comprising two shell segments 11, 12 that reach, in part, around the connection from the outside and in horizontal direction, with the shell segments comprising an upper and a lower edge adjacent to each of which an upper and a lower engaging section facing the connection is provided so that, should the connection of the two connection components come apart, the upper engaging section of the shell segments is supported against the upper engaging section provided at the upper connection component, while the lower engaging section of the shell segments holds the lower engaging section of the lower connection component (Figures 1-3).

Applicants' independent claim 1 requires that the upper connection component and the lower connection component are spaced apart by a substantially nonadjustable, fixed distance.

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In contrast to applicants' invention, Draut is directed to a method that "utilizes a rotary shaft coupling for connecting two axially aligned shafts having a connecting ring between the shafts and the coupling to permit selective relative axial adjustment of the shafts." (See Abstract).

In Draut the structural elements identified by reference numbers 18 and 19 (what the Examiner construes to be upper and lower connection components) are shafts that can be adjustable displaced from each other by a distance X by removing coupling half sections 11 and 12 and rotating ring 22 as discussed at column 2, lines 8-17.

The adjustable feature of Draut which is provided by the disclosed structure is excluding from applicants' claimed invention.

Accordingly, the present invention is both functionally and structurally distinguishable over Draut and the Examiner cannot rely upon Draut as anticipating applicants' claimed invention.

The Examiner as relied upon Tseng as disclosing:

...a locking device for vertical connection of an upper connection component 10, that comprises an upper engaging section, to a lower connection component 20, that comprise a lower engaging section, the locking device comprising two shell segments 30, 50 that reach, in part, around the connection from the outside and in horizontal direction, with the shell segments comprising an upper and a lower edge adjacent to each of which an upper and a lower engaging section facing the connection is provided so that, should the connection of the two connection components come apart, the upper engaging section of the shell segments is supported against the upper engaging section provide at the upper connection component, while the lower engaging section of the shell segments holds the lower engaging section of the lower connection component (Figures 1 and 4).

Reference numerals 30 and 50 in Tseng (what the Examiner construes to be shell segments) are disclosed as being a base member and a frame, respectively.

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Applicants' independent claim 1 required that shell segments only partially around opposite vertical sides reach, at least in part, around opposite vertical sides of the connection from the outside and in horizontal direction.

In Tseng the base member 30 is moved vertically to cover frame member 50.

Such a structural configuration does not meet or read on the limitations of applicants' independent claim 1.

Accordingly, Tseng does not anticipate applicants' invention.

On page 5 of the Office Action the Examiner has reminded applicants that "orientation is based upon the angle at which an object is viewed."

In the case of applicants' recited shell segments that Examiner will not that the limitations involve vertical and horizontal directional reference which would have to be resolved however the prior art is applied.

Based upon the above distinctions between the prior art relied upon by the Examiner and the present invention, and the overall teachings of prior art, properly considered as a whole, it is respectfully submitted that the Examiner cannot rely upon the prior art as required under 35 U.S.C. §102 as anticipating applicants' claimed invention.

It is, therefore, submitted that any reliance upon prior art would be improper inasmuch as the prior art does not remotely anticipate, teach, suggest or render obvious the present invention.

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It is submitted that the claims, as now amended, and the discussion contained herein clearly show that the claimed invention is novel and neither anticipated nor obvious over the teachings of the prior art and the outstanding rejection of the claims should hence be withdrawn.

Therefore, reconsideration and withdrawal of the outstanding rejection of the claims and an early allowance of the claims is believed to be in order.

It is believed that the above represents a complete response to the Official Action and reconsideration is requested.

The prior art made of record on page 7 of the Office Action has been noted, but is not deemed to be particularly relevant to applicants' claimed invention

If upon consideration of the above, the Examiner should feel that there remain outstanding issues in the present application that could be resolved, the Examiner is invited to contact applicant's patent counsel at the telephone number given below to discuss such issues.

To the extent necessary, a petition for an extension of time under 37 CFR §1.136 is hereby made. Please charge the fees due in connection with the filing of this paper, including extension of

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time fees, to Deposit Account No. 12-2136 and please credit any excess fees to such deposit account.

Respectfully submitted,



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## SUBSTITUTE SPECIFICATON - MARKED-UP COPY

DescriptionSAFETY MEANS FOR A VERTICAL CONNECTION OF TWO MEMBERS

5 Safety means for a vertical connection of two members

BACKGROUND OF THE INVENTIONField of the Invention

10 The present invention relates to a locking device for a vertical connection of two components, in particular for a pivot connection of ceiling-mounted medical supply units, in particular of ceiling-mounted medical stands.

Description of the Related Art

15 Ceiling-mounted medical stands are provided for overhead mounting of medical equipment, such as medical monitors, respirators, syringe pumps, etc. They are, for example, used in operating rooms or intensive-care units, etc. for accommodation of the systems required for operations, intensive care or examination of a patient. Since all of the supply lines for electric current, compressed air, oxygen, and other medical gases, etc. can be routed from the ceiling into the ceiling-mounted stands where they can be connected directly to the equipment, the necessity of placing the cables on the floor is avoided and the risk of stumbling over cables that are lying on the floor can, thus, be  
20 eliminated.

Ceiling-mounted stands consist of a column and at least one horizontal swinging arm that are mounted to the ceiling via a pivot connection such that they can be turned, and of an equipment carrier, also called stand head, that is provided to accommodate the necessary connections and devices. The pivoted arm permits the ceiling-mounted stand to be



swung across any radius desired, thus facilitating access to the patient or adjustment of an optimum working position. Coming out of the ceiling, all cables and supply lines are routed down into the ceiling-mounted stand where they are placed and from where they are routed through the pivot connection and the arm and to the stand head. The ceiling-mounted stand may also comprise two arms that are coupled to each other such that they can be pivoted.

The pivot connections must be able to carry the total weight of the ceiling-mounted stand, including the stand head and the equipment accommodated therein. Any tearing apart of the pivot connection must, under any and all circumstances, be avoided since, otherwise, the ceiling-mounted stand would fall down, maybe causing considerable personal injury and material damage.

#### BRIEF SUMMARY OF THE INVENTION

Therefore, the present invention aims at providing a locking device that reliably prevents the ceiling-mounted stand from falling down. Furthermore, the locking device should also be capable of being retrofitted to already existing systems without any considerable effort.

According to the invention, this problem is solved by means of a locking device that is discussed below. ~~according to Claim 1. Additional advantageous further developments are subject of the subordinate claims.~~

By forming the shell in individual shell segments and the washer in individual washer segments, it is also possible to retrofit the locking device without having to separate the cables and supply lines. Should retrofitting be necessary, the first step simply comprises sideward insertion of the washer segments above and below the pivot connection and fixing same via mounting screws of the pivot connection.

The engaging section of the shell segments comprises, to advantage, a ring segment section that is bent from the upper or lower edge at an essentially right angle. Thereby,

each shell segment can be fitted sideways onto the pivot connection in the manner of a clamp, with the upper and lower ring segment sections simply engaging above and below the washer respectively, thus securing the pivot connection against falling apart.

5 The engaging section of the washer segment is formed as a stepped projection protruding from the outer perimeter of the washer segment, thus ensuring easy mounting of the shell segments. Furthermore, the manufacture of such washer segments is simple and cost-effective.

10 By the engaging section of the shell segment and the engaging section of the washer segment extending along the entire perimeter, the force to be absorbed in the event of the pivot connection tearing apart is distributed over a maximum area, so that the wall thickness of the engaging section can be kept small. Thereby, it is possible to design the locking device in a discreet manner.

#### BRIEF DESCRIPTION OF SEVERAL VIEWS OF THE DRAWINGS

15 The invention will be illustrated in detail below by means of a presently preferred embodiment with reference being made to the enclosed drawings, in which:

Figure 1 is a partially broken lateral view of a pivot connection and two arms;

Figure 2 is a perspective view of a shell segment;

Figure 3 is a top view of two shell segments that are joined to form a ring; and

20 Figure 4 is a top view of two washer segments that are joined to form a ring.

#### DETAILED DESCRIPTION OF THE INVENTION

Fig. 1 indicates an upper arm 21 extending in horizontal direction and a lower arm 22 extending in horizontal direction, with both arms being connected to each other via a ver-

tical pivot connection 20 such that they can be turned. The pivot connection 20 comprises a hub 23 that is surrounded by two further cylindrical components not described in detail here. The hub 23 is formed as a hollow cylinder. The supply cables and tubes (not shown here) are placed in said hollow cylinder. The pivot connection 20 as such will, however,  
5 not be considered in more detail below.

In the present embodiment, the locking device for the pivot connection 20 is formed by two shell segments 1 enveloping the pivot connection and associated upper and lower washers 9 and 29 that are likewise arranged around the pivot connection.

Fig. 2 shows a shell segment 1. Since it is designed identically, the second shell segment will not be described in more detail here. As seen from above, the shell segment 1 has a semicircular shape. It possesses a shell segment surface 19 comprising a first free segment end 3 in circumferential direction and a second free segment end 4 arranged diametrically opposite to the first segment end. When installed as shown in Fig. 1, the shell segment comprises an upper edge 5 facing the upper arm 21 as well as an opposite  
15 lower edge 6 facing the lower arm 22. An upper projection is arranged at a right angle adjacent to the upper edge 5. Said projection extends inwards along the entire upper edge 5 in radial direction, thus forming a continuous engaging section 7. Likewise, a projection forming an engaging section 8 directed inwards in radial direction is arranged adjacent to the lower edge 6, also at a right angle. This radial projection extends inwards for only a  
20 few millimeters. However, the projection is dimensioned such that, by engaging the washer segments described below, it would be capable of reliably holding the weight of the ceiling-mounted stand and the equipment, should the pivot connection 20 tear apart. In the area of the segment end 3, two holes 24 through which screws can be fitted are provided in the shell segment surface 19. Two holes 24 are also provided at the other  
25 segment end 4.

As shown in Fig. 3, two shell segments 1 are joined to form a ring. The two shell segments 1 are connected to each other via a connection element 10 at either of the free segment ends 3 and 4. The connection element 10 consists of a plate provided with two holes corresponding to the holes 9. In the present executive form, the holes of the connec-

tion element 10 are provided with internal threads so that screws can be screwed into the connection element. It is, however, also possible to provide unthreaded holes. In this case, the screws are screwed to each other by means of a nut.

5 According to Fig. 1, a washer 9 facing the upper arm 21 and a washer 29 facing the lower arm 22 are provided. Since both washers are identical, only the upper washer 9 will be described in more detail below, with reference being made to Fig. 4.

10 According to Fig. 4, two washer segments 11 and 12 are joined to form an approximately closed washer 9. As seen from above, the two washer segments each have a semi-circular shape. They are designed in the form of a flat disk, comprising a first free washer end 15 in circumferential direction, a second washer end 16 arranged diametrically opposite to the first washer end 15, a circular surface 17, an inner perimeter side and an outer perimeter side. Several holes 18 through which screw bolts (that are not shown here) are fitted for mounting the washer segments to the pivot connection are provided in the circular surface 17. In the present embodiment, two holes are provided for each washer segment.  
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As shown in Fig. 4 and in Fig. 1, each washer segment 11, 12 possesses a projection that protrudes outwards in radial direction and is used as engaging section 13, 14. The wall thickness of each projection is less than the wall thickness of the washer segment. In the present embodiment, the wall thickness of the projection is about half the wall thickness of the washer segment. However, the projection is dimensioned such that, by engaging the engaging sections 7, 8 of the shell segments 1, it would be capable of reliably holding the weight of the ceiling-mounted stand and the equipment, should the pivot connection 20 tear apart. The size of the projection in radial direction is dimensioned such that its radial dimension is approximately equal to the radial dimension of the engaging section 7, 8 of the shell segment 1.  
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In the assembled state according to Fig. 1, the engaging segment 7, 8 of each shell segment 1, thus, protrudes behind the radial projection of the engaging section 13, 14 of each washer segment 11, 12, both at the upper edge 5 and the lower edge 6.

In the event of the pivot connection 20 tearing apart, the ceiling-mounted stand or parts thereof are prevented from falling down because, in such a case, the engaging sections 7, 8 of the two shell segments 1 come into engagement with the engaging sections 13, 14 of the washers 9 and 29, thus holding the pivot connection together. More accurately, the upper engaging section 7 is held by the projection of the upper washer 9, while the lower engaging section 8 holds the projection of the lower washer 29.

Retrofitting of the locking device will be described in the following. At first, screw bolts securing the pivot connection 20 are unscrewed and pulled out. Then the washer segments 11, 12 of the upper and lower washers 9 and 29 are inserted sideways above and below the pivot connection 20. Thereafter, new screw bolts that are longer by the thickness of the particular washer segments are fitted through the holes 18 on the circular surface 17 of the washer segments and retightened subsequently. In this manner, the washer segments 11, 12 are fixed to the pivot connection 20.

Now, the shell segments 1 are fitted onto the pivot connection 20 from the side and are connected to each other via the connection element 10 and the associated screws. As a result, the shell segments 1 envelop the pivot connection. Hereby, the engaging sections 7, 8 of the shell segments 1 engage the engaging section 13, 14 of the washer segments 11, 12, thus securing the pivot connection in the manner of a clamp.

Claims

1. Locking device for vertical connection of an upper connection component, that comprises an upper engaging section, to a lower connection component, that comprises a lower engaging section, whereby the locking device comprises at least two shell segments (1) that reach, at least in part, around the connection from the outside and in horizontal direction, with the shell segments (1) comprising an upper and a lower edge (5, 6) adjacent to each of which an upper and a lower engaging section (7, 8) facing the connection is provided so that, should the connection of the two connection components come apart, the upper engaging section (7) of the shell segments (1) is supported against the upper engaging section provided at the upper connection component, while the lower engaging section (8) of the shell segments (1) holds the lower engaging section (13, 14) of the lower connection component.
2. Locking device according to Claim 1, characterized by an upper and a lower washer (9) each being assembled of at least first and second washer segments (11, 12), whereby the washers (9) can each be pushed onto the connection from the outside and in horizontal direction, whereby, when installed, the upper washer (9) is fixed to the upper connection component and the lower washer (29) to the lower connection component, whereby the upper and lower engaging sections (13, 14) are each formed on the respective washer segments (11, 12).
3. Locking device according to Claim 1 or 2, characterized in that the shell segments (1) are connected to each other in the installed state.
4. Locking device according to one of the preceding claims, characterized in that the engaging section (7, 8) of the shell segment (1) is formed by a projection that is bent from the upper or lower edge (5, 6) at an essentially right angle.

5. Locking device according to one of the preceding claims, characterized in that the engaging section (13, 14) of the upper or lower connection component or washer segment (11, 12) is formed by a projection protruding from the outer perimeter of said washer segment.
- 5 6. Locking device according to the preceding claim, characterized in that the projection protruding from the outer perimeter is stepped.
7. Locking device according to one of the preceding claims, characterized in that the engaging section (7, 8) of the shell segment (1) extends along the entire upper or lower edge (5, 6).
- 10 8. Locking device according to one of the preceding claims, characterized in that the engaging section (13, 14) of the upper or lower connection component or washer segment (11, 12) extends along the entire outer perimeter.
9. Locking device for a pivot connection of a ceiling-mounted medical supply unit according to one of the preceding claims.

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Summary

A locking device is provided in order to prevent a ceiling-mounted stand comprising one or two arms and one stand head and being part of a ceiling-mounted medical supply unit from falling down should a pivot connection of two arms tear apart. The locking device comprises at least two shell segments (1) that reach around the pivot connection and are provided with a first and a second segment end (3, 4) and with an upper and a lower edge (5, 6) adjacent to each of which an engaging section (7, 8) facing the pivot connection is provided, as well as an upper and a lower washer (9, 29) that is assembled of at least first and second washer segments (11, 12) that are, in the installed state, connected to the pivot connection above and below said pivot connection, whereby the washer segments each comprise engaging sections (13, 14) that are associated with the engaging sections (7, 8) of the shell segments.

(Fig. 1)

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